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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,994	02/25/2004	Akira Fujibayashi	274.43167X00	9782
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MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C. 1800 DIAGONAL ROAD SUITE 370 ALEXANDRIA, VA 22314			EXAMINER MOORE, PATRICK M	
			ART UNIT	PAPER NUMBER
			2188	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/784,994	Applicant(s) FUJIBAYASHI, AKIRA	
	Examiner Patrick M. Moore	Art Unit 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>08/04/2005</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-28 have been examined.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "intelligent switch (SW) 301" on Page 5, Line 6. Additionally, the following references characters mentioned in the specification do not match their corresponding objects in the drawings: "front end (host) controller 3010" (Lines 8 & 11), "back end controller 3011" (Lines 9 & 11), "mapping tables 30101" (Line 13 & 15), all on Page 5.
3. The drawings are further objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "410" has been used to designate both "Initial Copy" and "Noinit option when users assure no WR I/O during suspend status" in Figure 4. Additionally, reference character "411" is referred to in the specification, but does not appear in the drawings.
4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of

any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-11 and 15-25 are rejected under 35 U.S.C. 103(a) as being obvious over the first and third embodiments disclosed by Mimatsu et al. (US PGPub # 2004/0111485).

a. As for Claim 1, the first embodiment of Mimatsu et al. discloses a network storage virtualization method in a network storage system having a plurality of network storage devices, said method comprising: allowing a client (Figure 1, # 1101) connected via a network (Figure 1, #1314) to access the network storage devices as one virtual network storage system (§0037, Figure 1, #1301).

b. The first embodiment of Mimatsu et al. does not expressly disclose separate access to the network storage devices. However, the third embodiment of Mimatsu et al. discloses permitting said client (Figure 16, #16101) to access the network storage devices (Figure 16, #16401 & #16501) separate from said virtualized network storage system (§0097, Figure 16, #16301). The first and third embodiments of Mimatsu et al. are analogous art because they are from the

same field of endeavor: connecting host computers to storage devices using a common interface.

c. At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the volume virtualization functionality of the first embodiment with the external access of the third embodiment, which uses an interface switch module (Figure 16, #16306). The motivation for doing so would have been to provide a device independent interface regardless of whether the hosts accessed a single virtualized volume or each volume separately as envisioned by ¶¶0006-0007. Therefore, it would have been obvious to combine the first and third embodiments of Mimatsu et al. for the benefit of having device independent communication to obtain the invention as specified in Claim 1. As for the remaining claims, references to Figure 1 are disclosed by the first embodiment of Mimatsu et al. and references to Figure 16 are taught by the third embodiment of Mimatsu et al.

d. As for Claim 2, Mimatsu et al. further discloses a network storage virtualization method according to claim 1, wherein a first network storage device (Figure 1, #1501) includes a disk interface (I/F) (Figure 1, #1502) which is connected to an apparatus having a function of forming said network storage devices as one virtual network storage device (¶¶0034 & Figure 1, #1301), and wherein a second network storage device (Figure 1, #1401 & Figure 16, #16401) includes a disk I/F (Figure 1, #1402) which is connected to said apparatus having a function of forming said network storage devices as one virtual network storage

device (¶0034 & Figure 1, #1301) and a host I/F (Figure 1, #1403 & Figure 16, #16403) which is connectable to an external device (Figure 1, #1101 or #1201 & Figure 16, #16101, 16201 or 16601) so as to permit said external device to access the network storage devices separate from said apparatus having a function of forming said network storage devices as one virtual network storage device (¶0042).

e. As for Claim 3, Mimatsu et al. further discloses a network storage virtualization method according to claim 2, wherein said external device (Figure 1, #1101 or #1201 & Figure 16, #16101, 16201 or 16601) is permitted to access a secondary volume (Figure 1, #1406 & Figure 16, #16406) which is a copy of a primary volume (¶0041, Figure 1, #1405 & Figure 16, #16405) and not permitted to access volumes other than said secondary volume (¶0042). Mimatsu et al. goes on to disclose a "LAN interface... externally receives an instruction " and outlines handling the instruction in ¶0042. Examples of such instruction could be pair initialization or suspension as disclosed in ¶0046.

f. As for Claim 4, Mimatsu et al. further discloses a network storage virtualization method according to claim 3, wherein said external device accesses said secondary volume (Figure 1, #1406 & Figure 16, #16406) via said host I/F (Figure 1, #1403 & Figure 16, #16403) of said second network storage device (¶0042).

g. As for Claim 5, Mimatsu et al. further discloses a network storage virtualization method according to claim 4, wherein a storage area network (SAN) is connected between said external device and said host I/F of said second network storage device (Figure 1, #1318). Mimatsu defines a storage area network (SAN) in ¶0005.

h. As for Claim 6, Mimatsu et al. further discloses a network storage virtualization method according to claim 1, wherein a first network storage device includes a disk interface (I/F) which is connected to an apparatus having a function of forming said network storage devices as one virtual network storage device (¶0034 & Figure 1, #1301), and wherein a second network storage device includes a first host I/F (Figure 1, #1402 & Figure 16, #16402) which is connected to said apparatus having a function of forming said network storage devices as one virtual network storage device and a second host I/F (Figure 1, #1403 & Figure 16, #16403) which is connectable to an external device (Figure 1, #1101 or #1201 & Figure 16, #16101, 16201 or 16601) so as to permit said external device to access the network storage devices separate from said apparatus having a function of forming said network storage devices as one virtual network storage device (¶0042).

i. As for Claim 7, Mimatsu et al. further discloses a network storage virtualization method according to claim 6, wherein said external device (Figure 1, #1101 or #1201 & Figure 16, #16101, 16201 or 16601) is permitted to access a secondary volume (Figure 1, #1406 & Figure 16, #16406) which is a copy of a

primary volume (§0041, Figure 1, #1405 & Figure 16, #16405) and not permitted to access volumes other than said secondary volume (§0042).

j. As for Claim 8, Mimatsu et al. further discloses a network storage virtualization method according to claim 7, wherein said external device accesses said secondary volume (Figure 1, #1406 & Figure 16, #16406) via said second host I/F (Figure 1, #1403 & Figure 16, #16403) of said second network storage device (§0042).

k. As for Claim 9, Mimatsu et al. further discloses a network storage virtualization method according to claim 8, wherein a storage area network (SAN) is connected between said external device and said second host I/F of said second network storage device (Figure 1, #1318).

l. As for Claim 10, Mimatsu et al. further discloses a network storage virtualization method according to claim 8, wherein a wide storage area network (WSAN) is connected (Figure 16, #16303, 16306 and 16304) between said apparatus having a function of forming said network storage devices as one virtual network storage device (Figure 16, #16301) and said first host I/F of said second network storage device (Figure 16, #16402).

m. As for Claim 11, Mimatsu et al. further discloses a network storage virtualization method according to claim 3, further comprising the step of: configuring access control of said secondary volume from outside of said apparatus having a function of forming said network storage devices as one

virtual network storage device (§0075). Mimatsu et al. discloses that an Administrator must properly configure a host (Figure 1, #1201) to access a common interface. This configuration, which must occur within the host, controls the host's access to the secondary volume.

n. As for Claim 15, Mimatsu et al. discloses a storage system comprising: a first network storage device which includes a primary volume (Figure 1, #1501); a second network storage device which includes a secondary volume (Figure 1, #1401) which is a copied volume of the primary volume (§0041) and volumes other than the secondary volume (Figure 2, #2106 & #2107); and a virtualization apparatus, which is connected to each of said first and second network storage devices (§0037, Figure 1, #1301 & Figure 16, #16301), and allows a client connected via a network to access the network storage devices as one virtual network storage system (§0037, Figure 1, #1301 & Figure 16, #16301) wherein said client is permitted to access the network storage devices separate from said virtualization apparatus (§0097, Figure 16, #16101).

o. As for Claim 16, Mimatsu et al. further discloses a storage system according to claim 15, wherein said first network storage device includes a disk interface (I/F) (Figure 1, #1502) which is connected to virtualization apparatus (Figure 1, #1301), and wherein a second network storage device includes a disk I/F (Figure 1, #1402 & Figure 16, #16402) which is connected to said virtualization apparatus and a host I/F (Figure 1, #1403 & Figure 16, #16403) which is connectable to an external device (Figure 1, #1101 or #1201 & Figure 16,

#16101, 16201 or 16601) so as to permit said external device to access the network storage devices separate from said virtualization apparatus (§0042).

p. As for Claim 17, Mimatsu et al. further discloses a storage system according to claim 16, wherein said external device (Figure 1, #1101 or #1201 & Figure 16, #16101, 16201 or 16601) is permitted to access said secondary volume (Figure 1, #1406 & Figure 16, #16406) which is a copy of said primary volume (§0041, Figure 1, #1405 & Figure 16, #16405) and not permitted to access said volumes other than said secondary volume (§0042).

q. As for Claim 18, Mimatsu et al. further discloses a storage system according to claim 17, wherein said external device accesses said secondary volume (Figure 1, #1406 & Figure 16, #16406) via said host I/F (Figure 1, #1403 & Figure 16, #16403) of said second network storage device (§0042).

r. As for Claim 19, Mimatsu et al. further discloses a storage system according to claim 18, wherein a storage area network (SAN) is connected between said external device and said host I/F of said second network storage device (Figure 1, #1318).

s. As for Claim 20, Mimatsu et al. further discloses a storage system according to claim 15, wherein said first network storage device includes a disk interface (I/F) which is connected to said virtualization apparatus (§0034 & Figure 1, #1301), and wherein said second network storage device includes a first host I/F (Figure 1, #1402 & Figure 16, #16402) which is connected to said virtualization

apparatus and a second host I/F (Figure 1, #1403 & Figure 16, #16403) which is connectable to an external device (Figure 1, #1101 or #1201 & Figure 16, #16101, 16201 or 16601) so as to permit said external device to access the network storage devices separate from said virtualization apparatus (§0042).

t. As for Claim 21, Mimatsu et al. further discloses a storage system according to claim 20, wherein said external device (Figure 1, #1101 or #1201 & Figure 16, #16101, 16201 or 16601) is permitted to access said secondary volume which is a copy of said primary volume and not permitted to access said volumes other than said secondary volume (§0042).

u. As for Claim 22, Mimatsu et al. further discloses a storage system according to claim 21, wherein said external device accesses said secondary volume (Figure 1, #1406 & Figure 16, #16406) via said second host I/F (Figure 1, #1403 & Figure 16, #16403) of said second network storage device (§0042).

v. As for Claim 23, Mimatsu et al. further discloses a storage system according to claim 22, wherein a storage area network (SAN) is connected between said external device and said second host I/F of said second network storage device (Figure 1, #1318).

w. As for Claim 24, Mimatsu et al. further discloses a storage system according to claim 22, wherein a wide storage area network (WSAN) is connected (Figure 16, #16303, 16306 and 16304) between said virtualization apparatus (Figure 16,

#16301) and said first host I/F of said second network storage device (Figure 16, #16402).

x. As for Claim 25, Mimatsu et al. further discloses a storage system according to claim 17, wherein access control of said secondary volume is configured from outside of said virtualization apparatus (§0075).

y. Identical motivation exists for combining the first and third embodiments of Mimatsu et al. as described above. Therefore, it remains obvious to combine these embodiments for the having device independent communication to obtain the invention as specified in Claim 2-11 and 15-25.

7. Claims 12-14 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mimatsu et al. (US PGPub # 2004/0111485) as applied to claims 1-11 and 15-25 above, and further in view of Ofek et al (US Patent # 5,889,935).

a. As for Claim 12, Mimatsu et al. discloses a network storage virtualization method according to claim 11, wherein said configuring step comprises the steps of: creating a mirroring pair between said primary volume (Figure 1, #1405) and said secondary volume (Figure 1, #1406) at a certain point in time by taking a complete initial copy of said primary volume and storing said complete initial copy in said secondary volume (§0041); receiving in said second storage device a suspend request (§0041); placing the mirroring pair into a suspend status to permit setting of the access control according to user selection (§0041); and re-synchronizing the mirroring pair (§0041).

b. Mimatsu et al. does not expressly disclose when the user chooses a read only mode, setting said secondary volume to the read only mode for input/output (I/O) requests from said external device; and if the user chooses a read/write mode, setting said secondary volume the read/write mode for input/output (I/O) requests from said external device. However, Ofek et al. discloses this functionality as "the requested state change is performed" (Column 24, Lines 52-53 & Figure 10, #442) and the requested state change refers to "Read-Only State" (Column 23, Lines 62-64) and "Read/Write State" (Column 23, Lines 65-67).

c. Mimatsu et al. and Ofek et al. are analogous art because they are from the similar problem solving areas: data mirroring of computer storage volumes. At the time of the invention, it would have been obvious for one of ordinary skill in the art to combine Ofek's host access control techniques (Read-Only and Read/Write) to the mirrored pairs disclosed by Mimatsu et al. because both references teach access of mirrored volumes by remote or external hosts. The motivation for doing so would have been to provide external hosts with specific access control techniques for the mirrored pair taught by Mimatsu et al.

d. Therefore, it would have been obvious to combine Ofek et al. with Mimatsu et al. for the benefit of creating a mirroring system, which applies well known mirrored volume control techniques to obtain the invention as specified in Claim 12.

e. As for Claim 13, Mimatsu et al. further discloses a network storage virtualization method according to claim 12, wherein when said secondary volume is set to the read only mode access to said secondary volume is performed according to the steps of: suspending synchronization of the mirroring pair including said primary volume and said secondary volume (¶0041); and upon completion of said access, re-synchronizing the mirroring pair (¶0041).

f. Mimatsu et al. does not expressly disclose permitting access to data on said secondary volume in response to an I/O request via the host I/F in read only mode. However, Ofek et al. discloses this functionality as “the requested state change is performed” (Column 24, Lines 52-53 & Figure 10, #442) and the requested state change refers to “Read-Only State” (Column 23, Lines 62-64).

g. As for Claim 14, Mimatsu et al. further discloses a network storage virtualization method according to claim 12, wherein when said secondary volume is set to the read/write mode access to said secondary volume is performed according to the steps of: suspending synchronization of the mirroring pair including said primary volume and said secondary volume (¶0041); and upon completion of said access, re-synchronizing the mirroring pair (¶0041).

h. Mimatsu et al. does not expressly disclose permitting access to data on said secondary volume in response to an I/O request via the host I/F in read/write mode. However, Ofek et al. discloses this functionality as “the requested state

change is performed" (Column 24, Lines 52-53 & Figure 10, #442) and the requested state change refers to "Read/Write State" (Column 23, Lines 65-67).

i. As for Claim 26, Mimatsu et al. further discloses a storage system according to claim 25, wherein said access control of said secondary volume is configured by creating a mirroring pair between said primary volume (Figure 1, #1405) and said secondary volume (Figure 1, #1406) at a certain point in time by taking a complete initial copy of said primary volume and storing said complete initial copy in said secondary volume (§0041), receiving in said second storage device a suspend request (§0041), placing the mirroring pair into a suspend status to permit setting of the access control according to user selection (§0041), and re-synchronizing the mirroring pair (§0041).

j. Mimatsu et al. does not expressly disclose when the user chooses a read only mode, setting said secondary volume to the read only mode for input/output (I/O) requests from said external device, and if the user chooses a read/write mode, setting said secondary volume the read/write mode for input/output (I/O) requests from said external device. However, Ofek et al. discloses this functionality as "the requested state change is performed" (Column 24, Lines 52-53 & Figure 10, #442) and the requested state change refers to "Read-Only State" (Column 23, Lines 62-64) and "Read/Write State" (Column 23, Lines 65-67).

k. As for Claim 27, Mimatsu et al. further discloses a storage system according to claim 26, wherein when said secondary volume is set to the read only mode access to said secondary volume is performed by suspending synchronization of the mirroring pair including said primary volume and said secondary volume (§0041), and upon completion of said access, re-synchronizing the mirroring pair (§0041).

l. Mimatsu does not expressly disclose permitting access to data on said secondary volume in response to an I/O request via the host I/F in a read only mode. However, Ofek et al. discloses this functionality as “the requested state change is performed” (Column 24, Lines 52-53 & Figure 10, #442) and the requested state change refers to “Read-Only State” (Column 23, Lines 62-64).

m. As for Claim 28, Mimatsu et al. further discloses a storage system according to claim 26, wherein when said secondary volume is set to the read/write mode access to said secondary volume is performed by suspending synchronization of the mirroring pair including said primary volume and said secondary volume (§0041), and upon completion of said access, re-synchronizing the mirroring pair (§0041).

n. Mimatsu does not expressly disclose permitting access to data on said secondary volume in response to an I/O request via the host I/ F in read/write mode. However, Ofek et al. discloses this functionality as “the requested state

change is performed" (Column 24, Lines 52-53 & Figure 10, #442) and the requested state change refers to "Read/Write State" (Column 23, Lines 65-67).

o. Identical motivation exists for combining Mimatsu et al. with Ofek et al. as described above. Therefore, it remains obvious to combine Ofek et al. with Mimatsu et al. for the benefit of creating a mirroring system, which applies well known mirrored volume control techniques to obtain the invention as specified in Claim 13, 14 and 26-28.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Thekkath et al. (US Patent # 6,173,293), Halligan et al. (US Patent # 6,141,707), Kern et al. (US Patent # 6,199,074) and "DiFFS: a Scalable Distributed File System" by Karamanolis et al. (HPL-2001-19).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick M. Moore whose telephone number is (571) 272-1239. The examiner can normally be reached on M-F 8:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabahn can be reached on (571) 272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PMM



GARY PORTKA
PRIMARY EXAMINER